

is hardly discernible in the presence of the peppermint/menthol flavoring agent.

In variations of the formula other bases may be employed, containing different polishing agents, humectants, gelling agents surfactants, fluorides, SAPP's, flavors, sweeteners, pigments, polyphosphates and desensitizing potassium salts, and equivalent anti-tartar and desensitizing toothpastes will result. Specifically, the gelling agent employed may be a mixture of one part of carrageenan and one part of xanthan gum or may include a Laponite®, the surfactant may be sodium or potassium cocomonoglyceride sulfate or sodium or potassium sarcosine, the polishing agent may be other silicas, such as Syloids® or Santocels®, or calcium carbonate or calcium phosphates, the SAPP may be a Carbopol®, the fluoride may be potassium monofluorophosphate, the pigment may be omitted and the potassium nitrate may be replaced by potassium citrate or potassium oxalate, and useful anti-tartar and desensitizing toothpastes or gels will result. Also, as described in Example 2, AHP, AAP's, PPTA, PBTA and EHDP may be present in the disclosed effective proportions with the polyphosphate or in partial or complete replacement of it and such applies to Example 1 and to Example 4, too.

Other oral compositions than toothpastes and gel dentifrices may also be made by employing the required components of the invention in a liquid medium, to make a mouthwash. In one such product the mouthwash base or solvent system will be 20% of ethanol in water, and will contain about 1/10 of each of the percentages of potassium pyrophosphate and potassium nitrate in the toothpaste of Example 1. In another product the mouthwash will also contain about 0.05% or 0.08% of sodium or potassium fluoride. A chewing gum may contain the same proportions of potassium pyrophosphate, potassium nitrate and sodium or potassium fluoride and SAPP as in Example 1, in a chicle or rubber base. A tooth powder may contain the same proportions of such four components, together with flavoring, in a base of Zeodent or other polishing agent. Such powder may be compressed to tablet, lozenge or pastille form, for crushing before use as a tooth powder, and a binding agent, such as starch or more gelling agent, may be used to aid in binding the components together. Additionally, other oral compositions and articles may be made, using the various components of the toothpastes of Examples 1-3 or some of them (but including the potassium salt pain killer and the polyphosphate or anti-calculus compound). All the products so described will have anti-tartar and desensitizing properties, and in all of them it will be desirable to utilize potassium compounds to the extent possible.

In all the invented oral compositions, including the toothpastes and gel dentifrices, the potassium polyphosphate or other anti-calculus agent and the desensitizing agent cooperate to produce improved desensitizing action, and such improvement is further promoted by the presence of the other described components of such dentifrices, including the SAPP, fluoride, surfactant, and other components of such compositions, especially when such are in the forms of potassium compounds, such as potassium salts.

Although the invention has been described with respect to highly preferred embodiments thereof it really has broader application in the area of dentifrices and tooth treatments. As was previously indicated, other anti-tartar and anti-calculus compounds and mixtures of such compounds, such as various AAP's (azacycloalkane-2,2-diphosphonic compounds, as described in Ser. No. 07/631,232), including AHP, may be employed instead of alkali metal polyphosphate, preferably as the potassium salt. Anti-calculus phosphono compounds

that are useful include PPTA, PBTA and EHDP, and AHP is a preferred AAP. The proportion of such anti-calculus compound will usually be in the range of 0.2 to 5%, such as 0.5 to 1.5%, and it will preferably be present as a potassium salt. The tooth pain inhibitor will usually be 2 to 10% of the composition, preferably 3 to 8% and the inhibitor will preferably be potassium nitrate or potassium citrate. When potassium pyrophosphate is not employed as the anti-tartar agent, so its potassium content is not present to help increase the pain inhibiting properties of the pain inhibitor other sources of potassium should be present, such as potassium fluoride, potassium saccharin, potassium detergent, etc., and the potassium content of the composition, in addition to the potassium of the pain inhibitor, should be in the range of 0.2 to 5%, preferably 0.5 to 3%, and such potassium should be in ionizable form. In such concentrations the potassium will improve desensitizing action of the tooth pain inhibitor and will not make the toothpaste or oral composition excessively salty. Of course, for other compositions which are normally more dilute (mouth washes, for example) or more concentrated, proportions of potassium may be adjusted accordingly.

The invention has been described in conjunction with illustrative embodiments thereof but is not to be considered to be limited to these because one of skill in the art will be able to utilize substitutes and equivalents thereof without departing from the bounds of the invention and the spirit thereof.

What is claimed is:

1. A desensitizing, anti-tartar toothpaste which consists essentially of an orally acceptable vehicle or base for such composition, an effective anti-tartar proportion anti-tartar agent of (a) tetrasodium pyrophosphate, (b) disodium pyrophosphate, (c) mixtures of (a) and (b) or (d) mixtures of at least one of (a) and (b) with a potassium pyrophosphate and

a desensitizing proportion of a tooth pain inhibiting potassium salt which passes through exposed dentin tubules to tooth nerves or neurons, which tooth pain inhibiting potassium salt is potassium nitrate, potassium citrate, potassium oxalate or a mixture of two or more thereof;

wherein there is present in said toothpaste from said anti-tartar agent or from an additional material a source of potassium ions in addition to the tooth pain inhibiting potassium salt, the oral composition having a potassium content, in addition to the potassium pain inhibitor, in the range 0.2 to 5% by weight such potassium being in ionizable form.

2. A toothpaste according to claim 1 which comprises 0.5 to 5% of anionic surfactant, 10 to 50% of polishing agent, 10 to 50% of humectant, 0.2 to 5% of thickener, 1 to 5% of said pyrophosphate, 2 to 10% of said potassium nitrate, potassium citrate or a mixture thereof and 20 to 50% of water.

3. A toothpaste according to claim 2 wherein the anionic surfactant is an anionic detergent, the polishing agent is a siliceous polishing agent, the humectant is selected from the group consisting of glycerol, sorbitol and polyethylene glycol, and mixtures of two or more thereof, the thickener is selected from the group consisting of natural and synthetic gums and colloids and the desensitizing compound is potassium nitrate, potassium citrate or a mixture thereof.

4. A toothpaste according to claim 3 which comprises 0.8 to 3% of alkali metal lauryl sulfate, 15 to 35% of silica, 15 to 40% of a mixture of two or more of glycerol, sorbitol and polyethylene glycol of molecular weight in the range of 200 to 1,000, 0.3 to 3% carrageenan, carboxymethylcellulose, xanthan or a mixture thereof, 1.5 to 4% of pyrophosphate, 3 to 8% of potassium nitrate and 25 to 45% of water.